Changing the Risk Assessment Paradigm: EPA’s Activities in Cumulative Risk

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Long-term Effort to Develop Guidance

- **1997:** EPA Science Policy Council issued guidance on planning and scoping for cumulative risk assessments

- **2003:** Published the “Framework for Cumulative Risk Assessment” (Phase 1)

- **Today:** Producing a report, “Issues, Case Studies, and Research Needs in Cumulative Risk Assessment” (Phase 2)

- **Future:** Agency guidelines for cumulative risk assessment (Phase 3)
Issues, Case Studies, and Research Needs in Cumulative Risk Assessment

• **Purpose**: to assist risk assessors in planning and conducting cumulative risk assessments
  – Provides illustrative examples, methods, tools

• Attempts to equally address ecological and human health approaches

• Format follows the *Framework*
  – Planning and Scoping/Problem Formulation
  – Analysis
  – Risk Characterization
“Issues Papers” on Cumulative Risk Assessment

• Published in *Environmental Health Perspectives* (2007)

• Topics:
  – Overview / rationale for cumulative risk assessment
  – Integrating / disaggregating health effects data
  – Combining multiple chemical and non-chemical stressors
  – Vulnerability due to environmental effects, lack of resilience or resources
Illustrative Case Studies

- **Large-scale assessments**
  - Ecological: watershed, landscape level approaches
  - Human health: community, population-centered assessments
- “Integrated” human health and ecological risk assessments

1999 National Air Toxics Assessment (EPA)
National Scale Assessment Predicted County Level Cancer Risk– County Medians
Evaluation of Illustrative Case Studies

• **Project Initiation**: Impetus, participants
• **Objectives and Scope**: Risk questions, management goals
• **Methods**: Approaches, data sources and gaps, resource/time investment
• **Results and Conclusions**: Risk characterization, risk communication, uncertainty analyses
• **Impact of Study**: Influence on management decision, stakeholder satisfaction, lessons learned
• **Evaluation**: Compared to *Framework*
Overarching Research Needs

• GIS-based technologies for accessing, retrieving, processing data
• Methods to couple environmental and public health data with epidemiologic information
• Computational methods to connect multiple data layers and capture uncertainties
• Improved decision frameworks and criteria to integrate cumulative effects to guide decisions and policies
  – Qualitative and quantitative approaches for various metrics
• Advanced methods: biologically-based modeling, toxicogenomics, nanoscale monitoring, etc.
Community-Based Risk Assessment (CBRA)

- NCER Workshop (October 2007)
- Draft research needs:
  - Infrastructure to share databases and methodologies to characterize stressors
  - Greater understanding of stressor interactions
  - New framework to integrate all chemical, non-chemical, and vulnerability issues into risk assessment
  - Apply models, tools, and frameworks from ecological sciences to human health risk

Figure adopted from Gohlke & Portier (2007)